

Claims

1. A process for increasing the yield of plants, characterized in that recombinant DNA molecules containing
 - (a) a region allowing the transcription specifically in the companion cells; and operatively linked thereto
 - (b) a nucleotide sequence encoding a polypeptide selected from the group consisting of:
 - (i) proteins with an enzymatic activity that cleaves sucrose;
 - (ii) sucrose transporters;
 - (iii) proteins the activity of which leads to the stimulation of the proton gradients located at the plasma membrane of plant cells; and
 - (iv) citrate synthases;and which are stably integrated into the genome of plants are expressed.
2. The process of claim 1, wherein the nucleotide sequence encodes a plant protein.
3. The process of claim 1, wherein the nucleotide sequence encodes a protein from a bacterium or a fungus.
4. The process of claim 1, wherein the nucleotide sequence encodes a protein with an enzymatic activity that cleaves sucrose, selected from the group consisting of sucrose synthases, sucrose phosphorylases and invertases.
5. The process of claim 1, wherein the nucleotide sequence encodes a sucrose transporter from *Spinacia oleracea*.
6. The process of claim 1, wherein the nucleotide sequence encodes a proton ATPase.
7. The process of claim 6, wherein the nucleotide sequence encodes a proton ATPase from *Solanum tuberosum* or from *Saccharomyces cerevisiae*.

8. The process of any one of claims 1 to 7, wherein the region mentioned in (a) is the rolC promoter from *Agrobacterium rhizogenes*.
9. A recombinant nucleic acid molecule containing
 - (a) a region allowing the transcription specifically in the companion cells of plants; and operatively linked thereto
 - (b) a nucleotide sequence encoding a polypeptide, selected from the group consisting of
 - (i) sucrose synthases;
 - (ii) sucrose phosphorylases;
 - (iii) sucrose transporters;
 - (iv) proteins the activity of which leads to the stimulation of the proton gradient located at the plasma membrane of plant cells; and
 - (v) citrate synthases.
10. A vector containing a recombinant nucleic acid molecule of claim 9.
11. The vector of claim 10 which is suitable for the transformation of plant cells and for integration of foreign DNA into the plant genome.
12. A plant cell transformed with and containing a recombinant nucleic acid molecule of claim 9.
13. A plant containing plant cells of claim 12, wherein the plant shows an increased yield in comparison to a corresponding non-transformed plant due to the expression of the recombinant nucleic acid molecule in the companion cells of the plant.
14. Propagation material of a plant of claim 13 containing plant cells of claim 12.
15. Use of a recombinant nucleic acid molecule containing a region allowing the transcription specifically in the companion cells of plants and operatively linked

thereto a nucleotide sequence encoding a polypeptide selected from the group consisting of

- (i) proteins with an enzymatic activity that cleaves sucrose;
- (ii) sucrose transporters;
- (iii) proteins the activity of which leads to the stimulation of the proton gradient located at the plasma membrane; and
- (iv) citrate synthases,

for the expression in transgenic plants for increasing the yield.